Gender Inequality in the Artificial Intelligence Era: Evidence from Developed Countries.

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ABSTRACT
This paper investigates gender inequality in the Artificial Intelligence (AI) era. Gender equality is one of the main goals of SDGs, which for years all the world countries have been striving to achieve, either by structurally and socially changing the domestic society or by helping other countries that suffer from this disease of inequality. While countries are working on the problem of inequality, artificial intelligence has been introduced to the world. Scholars have started to investigate the possible effect of AI on improving or even dis-improving equality. Due to the novelty of the AI research area, there aren't quantitative variables that capture that phenomenon. Therefore, most of the studies rely on the theoretical part of the story without any emphasis on the empirical side. Subsequently, in investigating the effect of AI on gender inequality, several studies explain the theoretical part only. The study will contribute to the existing body of literature by exploring the impact of artificial intelligence (AI) on gender inequality using theoretical and empirical approaches. To address the research question, the study retrieves the Gender Inequality Index (GII) from the United Nations Developmental Program (UNDP), and the number of jobs requiring AI knowledge that is demanded yearly by the Stanford Institute for Human-Centered Artificial Intelligence (HAI). By applying

(ISSN : 2536 - 9555)

the panel data approach, the study finds that AI does decrease gender inequality, as well as the two variables have a long-run co-integration association.

Keywords: Artificial Intelligence (AI), Gender Inequality, Public Sector, SDGs, Sustainability, OLS, Panel Co-integration, Granger Causality.

الملخص باللغة العربية:

تبحث هذه الورقة في عدم المساواة بين الجنسين في عصر الذكاء الاصطناعي (الذكاء الاصطناعي): دليل من بعض الدول المتقدمة المساواة بين الجنسين هي أحد الأهداف الرئيسية لأهداف التنمية المستدامة، والتي تسعى جميع دول العالم لسنوات إلى تحقيقها. إما عن طريق تغيير المجتمع المحلي هيكليا واجتماعيا أو عن طريق مساعدة البلدان الأخرى التي تعاني من مرض عدم المساواة هذا. بينما تعمل البلدان على حل مشكلة عدم المساواة، تم إدخال الذكاء الاصطناعي إلى العالم. بدأ العلماء في التحقق من التأثير المحتمل للذكاء الاصطناعي على تحسين أو حتى عدم تحسين المساواة. نظرا لحداثة مجال البحث الذكاء الاصطناعي، لا توجد متغيرات كمية تلتقط هذه الظاهرة. لذلك، تعتمد غالبية الدراسات على الجزء النظري من الموضوع دون أي تركيز على الجانب التجريبي. بالتالي، عند التحقيق في تأثير الذكاء الاصطناعي على عدم المساواة بين الجنسين، تشرح العديد من الدراسات الجزء النظري فقط. ستساهم دراستنا في مجموعة الأدبيات الحالية من خلال استكشاف تأثير الذكاء الاصطناعي (الذكاء الاصطناعي) على عدم المساواة بين الجنسين باستخدام الأساليب النظرية والتجريبية. لمعالجة سؤال البحث، سوف تسترجع الدراسة مؤشر عدم المساواة بين الجنسين (GII) من برنامج الأمم المتحدة الإنمائي (UNDP)، وعدد الوظائف التي تتطلب المعرفة التامة بالذكاء الاصطناعي والمطلوبة سنويا من قبل معهد ستانفورد للذكاء الاصطناعي الذي يتمحور حول الإنسان (HAI) لمجموعة من الدول المتقدمة. من خلال تطبيق نهج بيانات الفريق، وجدت الدراسة أن الذكاء الاصطناعي يقلل من عدم المساواة بين الجنسين، بالإضافة إلى أن المتغيرين لهما ارتباط تكامل مشترك طويل الأجل.

كلمات دالة: الذكاء الاصطناعي، عدم المساواة بين الجنسين، القطاع العام، أهداف التنمية المستدامة، الاستدامة.

Introduction

Effective allocation of the female workforce to its productive positions becomes a significant issue rather than a moral one. Hence, helping women to get their opportunities becomes a need for the global economy and requires suitable conditions. Gender inequality is one of the most critical issues to industry growth regarding value-added and labor productivity, especially in the Artificial Intelligence Era (Ata et al. 2020).

In this context, artificial intelligence (AI) implications have importance in different public and private sectors due to its economic and social benefits. There are various challenges facing gender equality, and AI can create opportunities and achieve equity. Gender inequality is influenced by many different practices such as economic structures, legal systems, workplace environments, and social policies. All these practices are visible in the workplace and become more challenging for gender inequality with the increasing technological advent and automation.

Frequent technological advancements in processing complicated data analysis ask computers to perform many tasks perfectly and speedily. Different sectors, fields, and organizations have become significantly interested in applying these advancements in their workplace. Current governments recognize well the importance of using digital technologies in professional and personal lives and how these features of digital technologies especially (AI) can lead to gender equity commitment and enhance work for gender equality. In addition to the governmental interest in the AI implications, academic researchers have revived this interest over the last 50 years. (Nahar, S. 2024)

AI changes businesses and institutions to an elevated performance level. Technological advent is strongly related to human skills in a complementary way. Women have a low level of presentation in the technology sector but job growth in traditional female positions such as professional and managerial jobs.

(ISSN : 2536 - 9555)

Artificial Intelligence is expected to expand in the next years as all industries will be affected by the implementation of AI systems, resulting in the digitalization of work processes. This will cause a clear change in workforce structure especially gender inequality, in terms of the number and profiles of jobs in industries as well as worker skill requirements. AI is expected to generate annual value in various industries estimated between $3.5 and $5.8 trillion due to AI's ability to automate repetitive tasks, improve decision-making, and optimize processes (Truong and Papagiannidis, 2022).

Improving female skills field of AI and machine learning is a necessity due to the main role of women in the labour market. In this regard, many Efforts should be made starting with providing women with the required competencies, filling the gender gap in technological opportunities, enhancing career progression, and tackling the challenges of automation. (Brussevich, M. et al. 2018). The economic pillar of global SDGs (1–3) focuses on creating sustainable, inclusive, and equitable economic growth and development. For example, digital financial services will create employment opportunities and reduce poverty, (Mathiyazhagan et al., 2021). Nevertheless, it is expected to increase global GDP by 14 % to $15.7 trillion in 2030, more than the GDP of China and India combined. (World Economic Forum, 2023).

1.1. Research Problem

Gender equality is one of the main goals of SDGs, which for years all the world countries have been striving to achieve. Either by structurally and socially changing the domestic society or by helping other countries that suffer from this disease of inequality. While countries are working on the problem of inequality, artificial intelligence has been introduced to the world. Scholars have started to investigate the possible effect of AI on improving or even dis-improving equality. Due to the novelty of the AI research area, there aren't quantitative variables that capture that phenomenon. Therefore, most of the studies rely on the theoretical part of the story without any emphasis on the empirical side. Subsequently, in investigating the effect of AI on gender inequality, several studies

explain the theoretical part only. So, the main research question will be: what is the impact of AI on gender inequality as stated in the economic regression analysis of some developed countries?

1.2. Contribution and Importance

The study will contribute to the existing body of literature by exploring the impact of artificial intelligence (AI) on gender inequality using theoretical and empirical approaches. Bridging the gap between the theoretical and empirical approaches will improve our understanding of the dynamics of the relationship between AI and gender inequality. The main aim of the study is to explore the effect of jobs created by AI on the existing gender inequality. To identify if introducing AI is improving gender equality between men and women or if it contributes to deepening the problem. The study is organized as follows: the first section after the introduction is a literature review in which AI, gender inequality, and the maintenance of such relationships are highlighted. Followed by the methodology, results, and findings. The study will then conclude the main findings and state the policy recommendations. this study also provides contributions to practitioners and policymakers as a useful guideline planning tool to realize the digital divide and focus on gender consideration. The paper structure will be as follows. The following section provides the research questions followed by examining the existing literature concerning the overall research theme and the studied variables under consideration. The section that follows establishes the data analyses. The paper concludes with sections on the findings, conclusion, and possible future research agenda.

1.3. Research Questions

The study has research questions derived from the main research question as follows:

a. What is the relationship between technology and gender inequality?

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b. How does the advancement of technology affect gender equally in the labour market?
c. How could countries set policy measures to ensure equal opportunities in access to education and AI systems technology?
d. Are AI and gender inequality co-integrating in the long run?
e. What is the causality relationship between AI and gender inequality?

1.4. Literature Review

Relevant information and data have been collected from secondary sources such as scientific research articles, newspaper articles, books, and websites. There is a considerable gap between the expected outcomes of generative artificial intelligence (gen AI) and the reality of AI in gender practice (Nzobonimpa, S. 2023).

1.4.1. Artificial Intelligence (AI)

The Advisory Committee on Equal Opportunities (2020) showed that Artificial intelligence (AI) refers to systems that show intelligent behaviors by assessing the environment and then taking actions autonomously to achieve certain goals. These systems are purely software-based, acting virtually or AI can be included in hardware devices. Different sectors pay great attention to AI this is why many related challenges have appeared in this regard (Vetrò, A. et al. 2018).

AI mainly focuses on diverse technologies, such as robotics, machine learning, image recognition, speech recognition, computer vision, natural language processing, and analytics that imitate human behavior, rather than a single technology. (Nahar, S. 2024). AI and deep learning networks significantly depend on experienced specialists to accomplish their tasks (Yuan, P.H. et al. 2024).

Truong and Papagiannidis (2022), Leal Filho et al., (2022), Huang and Rust, (2018), and Longoni et al. (2019) indicate that AI is an intelligent machine, and it is all about computer intelligence that reflects cognitive potential such as problem-solving using computers supported by algorithms or numerical method to imitate

human cognitive and conversational activities. AI can learn from data, process data for human use, and update outcomes without any need for human involvement or programming assistance. For example, AI academics have created algorithms that can assist social sciences in tackling the difficulties of analyzing big data such as SDGs. It is a developed computer system that can perform missions that require human intelligence. AI has been at the initial of many recent innovative breakthroughs and has had an impact on innovative various industries.

Abdelhalim, E. et al. (2024) confirmed that AI agents focus on the ability to include conversations and users through a combination of NLP (natural language processing) social factors such as gender, age, gestures, facial expressions, and common phrases should be included. It includes a diver's systems, purposes, and capabilities, which have different names, including virtual assistants or automated chat systems designed to simulate human-like conversations.

Gomez-Herrera, E. and S. Koeszegi (2022) highlighted that AI includes algorithms, automated decision systems, and robots. They also include voice assistance systems, chatbots, collaborative robots, and service robots. These robots can communicate with humans in natural language, and they can respond to human behaviors and messages, and adapt to various situations. They are pre-programmed according to rules and behavioral norms. Hence, 'AI systems include a broad range of intelligent tools which are already related to all life aspects and will have a direct impact in the future in terms of creating jobs as certain jobs will be automated, new jobs will emerge, and almost all jobs will use AI technology and automation, new – digital – skills will be required. Shifts in workforce markets will probably change in numbers, job profiles of industries, and workers' skills requirements. The impact of AI technologies implementation on changing labor markets starts from understanding job automation, digitalization, and computerization.

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This means that AI perceptions and usage should start by investigating the different educational levels of students' adoption and perceptions of ChatGPT and other AI chatbots in higher education. In his study, Stohr, S. et al. (2024) found that Females especially from the medicine and humanities expressed more negative impressions and concerns about AI's role in assessment, while males in technology and engineering studying field showed higher optimism and usage. These findings validate the continued relevance of gender backgrounds as a determinator of technology adoption and reveal considerations and challenges surrounding AI usage in education. Subsequently, this will be a good indicator for testing the effect of AI adoption on the labor market regarding gender inequality.

1.4.2. Gender Inequality

Multiple types of research discussed gender and differentiated it from sex as the latter indicates biological attributes determinant of health and gender is multidimensional, it includes psychological, social, and cultural dimensions and includes gender-diverse people. (Buslon, N. et al. 2022)

Gender equality increases the skilled workforce by reinforcing women's employment opportunities with more productivity and efficiency, which in turn leads to the country's competitive advantage and is a significant tool in reshaping its industrial engagement in advanced industries (Ryu, D. et al. 2024).

Since 1970, literature has studied gender inequality is a rare study of this topic in the AI Era. Literature has emphasized the positive impact of gender equality on organizational performance (Bertay, C. A. et al. 2023). Recently, literature on gender inequality in the marketplace has shown the increasing economic inequality between men and women in hiring and getting job opportunities (Pisanelli, E. 2022).

Cabers et al. (2014), Bertay, C. A., Dordevic, L., and Sever, C. (2020) argued that many different works of literature studied the determinants of the gender wage gap which emphasized that

gender equality has positive effects on development, and it could hinder economic development in terms of its impacts on the creation of human capital and fertility. Those studies found that gender inequality and economic growth negatively correlated. Most empirical contributions to date also document a significant negative relationship between gender inequality and growth.

Gonzales, S. (2015) and many different empirical studies identify the causal impact of gender inequality on economic growth as a major challenge by using regression analysis to relate the income growth with countries' per capita to different gender inequality proxies, such as population growth, level of investment, and openness to trade, governmental and institutional quality. Development can play a major role in reducing gender inequality and, at the same time higher gender equality may support development. Moreover, many additional factors could enhance the growth and decrease the gender gap.

From this perspective, enhancing the participation of the female workforce improves and supports the evolution of industrial sectors by creating more job opportunities. (Ryu, D. et al. 2024).

In this regard, Stotsky, J.G., et al. (2016) and Jain-Chandra, S., et al. (2018) confirmed that higher gender equality supports economic growth by allocating female labor to its more productive use. this is why the argument that gender equality is considered a macro-level issue with a high priority on the policymakers' agenda. So, it's important to design Policies that ensure more consideration for women starting from improving women's legal rights regarding health, education, financial services, and technology this will lead to human rights, equity, and social justice, and boost economic growth.

Gender inequality prevents women from reaching more advanced industrial sectors that are vital for increasing economic growth and improving investment indicators in technology and innovative jobs. It limits women's employment opportunities and reduces the

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returns on investment in human capital. High-productivity countries with fewer uncertainties have skilled female employees due to the increased investment in female education which boosts the female workforce pool and opens advanced opportunities in skill-intensive industries, especially in the AI Era. (Ryu, D. et al. 2024).

1.4.3. Manifestation of Gender Inequality in the AI Era

Using AI has become an imperative input in our lives. It is changing the way we work. Everyone started depending on AI for speed, accuracy, and quality of work. At an organization's level, the HRM department is not an exception to AI. As a result, anyone can see a reasonable gap between the given promise and the reality of AI in HRM. It is quite evident that due to its rapidly changing technology, AI can be helpful to give desirable shape to the organization and change the future of the workplace. Employees adopting AI is a challenge and should be dealt with carefully to enjoy all the benefits of AI (Hassani, H.et al. 2023).

Tambe, Cappelli, & Yakubovich, (2019), Mohanty & Mishra, (2020) argued that When equality, diversity, and inclusion (EDI) issues are effectively managed in organizations, positive outcomes are highly achieved such as boosting organizational commitment, productivity, transparency, satisfaction, and creativity. Organizations can benefit from AI implications to enhance productivity and create positive economic and social impact. The comprehensive utilization of AI implications allows companies to process huge data to support and build their forecasting capabilities.

Kamasak, R. et al. (2024) AI-based technologies attract and retain talents. Moreover, organizations face challenges in attracting skilled talents to maximize value-creation opportunities. It is noted from the results of queries conducted between 2017 and 2022 that there is an increasing trend regarding diversity and AI interaction but a relatively decreasing trend regarding equality and AI interaction due to the rising interest in supporting diversity with AI in these organizations due to the positive impact of diversity

management on its competitive advantage. Equality is an essential requirement for all societal groups, and its impact on organizational performance is highly invaluable.

Gomez-Herrera, E. and S. Koeszegi (2022) refer to gender inequalities as a vicious cycle that is too difficult to break out of. it is not enough to analyze labour markets only to understand this problem. Gender inequalities in societies are the main causes of early discrimination of genders in educational systems, as a result, few girls are chosen for education in science, technology, engineering, and mathematics (STEM) and information and communication technologies (ICT). Subsequently, only a few females have access to technology in terms of enhancing their inclusion in the digital economy and supporting their economic opportunities through empowering them. AI can use technologies to support issues of gender equality, helping policymakers develop evidence-based policies to tackle these problems. AI can promote women's empowerment and gender equality.

Park, Y. (2022) suggests that digital consumption may cause inequalities in which members of diverse social groups could understand technological risks and benefits on an unequal term when they access and use these platforms and applications.

AI can enrich inequalities by ignoring and discriminating against some population groups, such as women (Baumgartner, R. et al. 2023). Technology adoption has been discussed through models and theories such as the Technology Acceptance Model (TAM), the Planned Behaviour theory, and the Unified Theory of Acceptance and Use of Technology (UTAUT) These theories investigate the link between attitudes, demographics, and AI usage. Gender has been provided as a mediating variable in AI adoption which has been linked to performance expectancy for males and ease of use for females (Stohr, C. et al.2024). Recent studies emphasize the significance of facing gender biases in AI, such as technology adoption and medical biases of imaging, which can

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disadvantage certain groups, especially women. (Nedungadi, P. et al. 2024)

Parasurama and Sedoc, (2021), and Wilson et al., (2016) outlined that Many recruiters face challenges in selecting the best candidates for vacancies due to gender stereotyping. Firms use artificial intelligence (AI) algorithms to remove gender stereotypes in the recruitment stage by automated screening. The use of automated screening has different effects on gender equality. This can help firms efficiently select the highest-performing job candidates and improve workforce diversity. AI algorithms help discriminate against women based on the gendered information mentioned in applicants' resumes. This happened once in 2018 when Amazon was accused of discriminating against women. There was gender blind, and Its algorithm learned to discriminate candidates based on the gendered information in their resumes, such as whether the candidate went to a female college or was the female football team captain.

Artificial intelligence generation (gen AI) can potentially boost economic activity. It makes workers more productive and realizes firm growth as well as innovation. Gen AI has great effects on wages. It is important to highlight that increasing adoption of AI will increase gender inequality as well as the fintech gender gap. Similar disparities in gen AI usage could exacerbate discrepancies in pay and job opportunities.

To assess who will benefit from gen AI and how it will shape inequality; it is thus crucial to understand who uses it and why (not), this is confirmed by Chen et al., (2023) Aldasoro, I. et al. (2024), and Cazzaniga, M. et al. (2024). Ata, C. B. et al. (2020) assume that to ensure sustainable economic growth and productivity, more inclusion for women participation in the workforce and decent life is required as its development pace is slow. Although women represent half of the total world population, they remain an untapped resource with less than a third of the actual workforce.

Black and Spitz-Oener, (2010), Acemoglu and Restrepo (2022). Acemoglu and Restrepo (2019) confirmed that the advent of new technologies called the 'Fourth Industrial Revolution', including robots and AI, is expected to produce inequalities by speeding up the process of polarization in the workforce market resulting in differences in wages and skills due to the changes in work nature depending more on how the employee becomes familiar with the new technologies. Moreover, it creates a gap between incumbents with a long tenure and recently hired employees. Gender and technology could affect the gender wage gap as it is expected to observe a decrease in women's share in routine tasks as in France and pay a higher wage to newly hired workers after AI the overall positive effect on wages will impact tech workers, while production workers expected to observe a wage loss. but for gender pay differences, it is found that investments in AI do not be associated with a change in the gender wage gap.

In this meaning, Pisanelli, E. (2022) confirmed that using AI algorithms affects automated resume screening which in turn will affect the gender gap in employment opportunities. This leads to lower interviewing for women with a 69% chance than equally qualified men. Introducing automated resume screening as a new AI tool for recruiters leads to reducing the gender gap. Thus, using AI in automated resume screening through AI algorithms can be effective in reducing gender gaps at the early stages of the hiring process. From the aforementioned, women should become familiar with using AI algorithms to get their opportunities in the labor market as a precondition for employability.

However, firm technology or size might modify the profile of the new hires and, the wage distribution within firms in addition to the role of tasks and institutions in shaping the evolution of wage inequality. In Norwegian firms, robots increase wages for high-skilled workers and managerial occupations, thus positively affecting wage inequality this was supported by individual workers' outcomes in the Netherlands after automation as daily

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wages increase, although days of work decrease. (Domini, G. et al. 2022). Hence, it is expected that AI and robots on one hand affect positively the gender wage gap especially those related to the profile of the newly hired, technicians, and highly skilled workers in addition to the role of tasks and institutions in shaping the evolution of wage inequality.

Many different AI innovations such as conversational agents simulating humans through the processing of natural language and machine learning algorithms – have become more attractive for implication. This paradigm shift has become the fastest-growing application worldwide due to the forcing of tech companies to push their AI development programs. AI tools and implications extend well its potentialities to increase efficiency, accuracy, and cost savings which is quickly highlighted. This seemingly opens various opportunities and new challenges to be discussed in academia. (Stohr, C. et al.2024).

The impact of AI on employment, privacy concerns including the risk of persuasion by information flows, the possibility of biased decision-making, the safety of critical applications like AI systems regulating the water supply, and cybersecurity concerns (Baumgartner, R. et al.2023). Hence, as mentioned above, AI becomes a necessity for organizations to realize economic efficiency in terms of saving costs, time, and effort, and to gain financial privileges as well. Additionally, this will support the competitive advantage of many organizations.

Methodology and Economic Regression Analysis.

Gender inequality in the age of AI is an issue of concern. In which, the effect of AI development on gender inequality is ambiguous. Besides, to our knowledge, there isn't a quantitative analysis of such a relationship. In this study, we searched for well-known databases to detect the indexes for both gender inequality and AI. The Gender Inequality Index (GII) is issued by the United Nations Developmental Program (UNDP) yearly for most of the world countries. We found that Stanford University, especially the Stanford Institute for Human-Centered Artificial Intelligence

(HAI), issues a report tackling multiple dimensions of AI yearly. One of the main tackled dimensions is the economy, in which the report specifies the number of jobs requiring AI knowledge that is demanded yearly. This variable is measured for New Zealand, Italy, Germany, the United Kingdom, Austria, Australia, Switzerland, Canada, France, Netherlands, Belgium, Sweden, Spain, and the United States. Therefore, we will perform a parsimonious regression to identify the possible relationship between gender inequality and the job demands for AI knowledge. The reason behind choosing such an index for AI is that it deals with the job market, which is always the number one concern. Second, it could reflect the inequality between men and women as well as capture jobs that require AI knowledge which is an indicator of the effect of AI on education and skills acquisition.

Data is retrieved from UNDP and HAI, from 2014 till 2022. The study will perform a panel data econometric approach. We will start with panel stationarity to identify the suitable regression model, followed by the Hausman test to identify whether fixed or random effects are suitable for the data under analysis. The regression model used is panel EGLS which is corrected for the possible heteroscedasticity and autocorrelation in the residuals. Then, a panel co-integration test will be performed to identify the long-term relationship between AI and GII as well as the Granger causality test to identify the possible causation effect between the variables under analysis. As stated earlier, we chose a parsimonious regression to keep the equation in the reduced functional form without including further explanatory variables. so that the investigated relationship is kept direct, eliminating the risk of omitting relevant variables due to data unavailability, and reducing the risk of analytical freedom (Saboori et al. 2012, Riti et al. 2017, Ahmad et al. 2017, Du et al. 2012, and Yavuz 2014). The regression equation is as follows,

$$GII_t = \alpha + \beta_t AI_{jobs} + \mu_t$$

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Where GII is the gender inequality index retrieved from the United Nations Developmental Program (UNDP), α is the statistical intercept, β is the slope between AI and GII, AIjobs is the jobs that require AI knowledge retrieved from the Stanford Institute for Human-Centered Artificial Intelligence (HAI), and t is the time.

Findings and Discussion

Table 1 exhibits the descriptive statistics of GII and AIjobs.

Table 1

Descriptive Statistics

	GII	AI Jobs
Mean	0.084778	0.008959
Standard Error	0.005261	0.000431
Median	0.078	0.00915
Mode	0.048	0.0023
Standard Deviation	0.049911	0.004087
Sample Variance	0.002491	1.67E-05
Kurtosis	0.820129	-0.66908
Skewness	1.042618	0.219438
Range	0.204	0.0182
Minimum	0.017	0.0015
Maximum	0.221	0.0197
Sum	7.63	0.8063
Count	90	90
Confidence Level (95.0%)	0.010454	0.000856

Besides, Table 2 represents the stationarity output of both GII and AI jobs. The findings show that both variables are stationary at levels. Both variables are integrated at I (0). Moving to identify whether fixed or random effects fit the model under consideration, Hausman test results concluded that random effects are more suitable (Table 3).

Table 2

Stationarity Results

Variable	(Statistic)[P-Value]
AI jobs	(-1.83418) **
GII	(-5.52949) ***

Table 3

Hausman Test

Cross-Section Random	**(Statistic)[P-Value]**
	(1.291996)

Panel EGLS is performed to identify the relationship between GII and AI jobs. The findings show that when AI jobs increase by 1 unit, gender inequality will decrease by 1.32 units. Emphasizing that AI helps in diminishing gender inequality in the sample. In addition, when AI jobs at first lag increase by 1 unit, gender inequality will decrease by 1.719 units. Illustrating that throughout the years AI jobs created will help in eliminating gender inequality. The R-squared is 49%. Table 4 captures the panel EGLS results.

Table 4

Panel EGLS Results

Dependent Variable: Gender Inequality Index (GII)		
Variable	Coefficient	P-value
AI Jobs	-1.321101	0.0328
AI Jobs (-1)	-1.719404	0.0046
C	0.100652	0.0000

Moreover, table 5 will represent the findings of the Pedroni Residual Cointegration Test. As concluded, eight out of the eleven statistics are significant indicating that there is a long-run co-

(ISSN : 2536 - 9555)

integration between AI jobs and gender inequality. Lastly, Granger causality test results show that there is a unidirectional causality running from AI jobs to gender inequality at a 10% level of significance (Table 6).

Table 5

Panel Co-integration Results

Test	Statistic	Prob.	Statistic	Prob.
Panel v-statistic	1.382343	0.0834	1.470434	0.0707
Panel rho-statistic	-0.742170	0.2290	-0.915858	0.1477
Panel PP-statistic	-3.234457	0.0006	-4.706473	0.0000
Panel ADF-statistic	-3.306760	0.0005	-4.693846	0.0000
Group rho-statistic	1.405529	0.9201		
Group PP-statistic	-5.558276	0.0000		
Group ADF-statistic	-5.548737	0.0000		

Table 6

Panel Granger Causality Test Results

Null Hypothesis	Probability
AI jobs does not Granger Cause GII	0.0553
GII does not Granger Cause AI jobs	0.2598

Conclusion

Summary

It is essential to consider gender discrimination to achieve equality. These inequalities intersect with socioeconomic factors, denying people rights and equal opportunities, poverty, and disabilities. Artificial intelligence needs to reflect the different socioeconomic scenarios by conducting auditing of algorithms to reinforce accountability, transparency, and fairness. The feminist approach in the AI Era should be reviewed to ensure economic and equity inclusion in the results of implications.

Social participation is significant in respecting fundamental rights and overseeing the progress of new technologies that impact citizens' lives, especially in vulnerable groups or those with low incomes. A new perspective on gender equality should be considered to promote equality between women and men. So, gender equity in the AI era requires a new time framework, commitment, and institutional and political leadership support. This study investigates the impact of AI with its new learning machines' implications on gender inequity in the labor market. AI affects significantly productivity, inclusion, and equality in any organization. AI influences Sustainable Development Goals (SDGs) in developed and developing countries alike. There are expectations that women will face displacement in the workplace opportunities and will be less represented in the AI era.

In the dynamic environment of today’s world of business, Artificial intelligence (AI) has become a necessity for accelerating businesses. It is expected that AI will improve productivity and increase profitability, however, many challenges arise from its implications. AI is expected also to lead to more job creation and workforce upskilling and reskilling rather than job displacement by increasing demand for skilled labor which requires providing more personalized training and learning opportunities.

(ISSN : 2536 - 9555)

This study is an added value to the scientific accumulation of the literature on gender inequality in the AI era. By bridging the gap between theoretical and empirical analysis, our study finds that AI has a positive impact on decreasing gender inequality among the sample countries. Besides, AI and gender inequality have a long run cointegration, in which AI could be used as a tool to eradicate inequality.

Future Research

We encourage future researchers to study empirically the relationship between AI and gender inequality in developing countries. Also, conduct a comparative analysis between developing and developed nations in dealing with inequalities using AI. The study enhances the development process of local solutions to AI in education tailored to gender attributes and needs, and it provides insights for developers, educators, and policymakers.

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